ORDER NO. GAD8610071C2

Service Manual

Clock Radio Cassette Recorder

RC-X80L

(Black)

FM-LW Clock Radio Cassette Recorder

This is the Service Manual for the following areas.

Z ...For all European areas except France.

F ...For France.

RX-1210 MECHANISM SERIES

■ SPECIFICATIONS

General:

Power Requirement:	AC; 220 V, 50 Hz Battery; 9 V (006P/6F22) for Battery Back-up
Power Consumption:	8 W (AC only)
Power Output:	1.5 W...RMS (max.)
Speaker:	PM Dynamic Speaker (8 cm, 8Ω)
Dimensions:	304 (W)×116 (H)×110 (D) mm
Weight:	1.35 kg (without battery)

Radio Section:

Radio Frequency Range:	FM; 87.5~108 MHz LW; 148.5~255 kHz (2020~1176 m)
Intermediate Frequency:	FM; 10.7 MHz LW; 455 kHz
Sensitivity:	FM; 4 µV/50 mW output (−3 dB Limit sens) LW; 180 µV/m/50 mW output

Tape Deck Section:

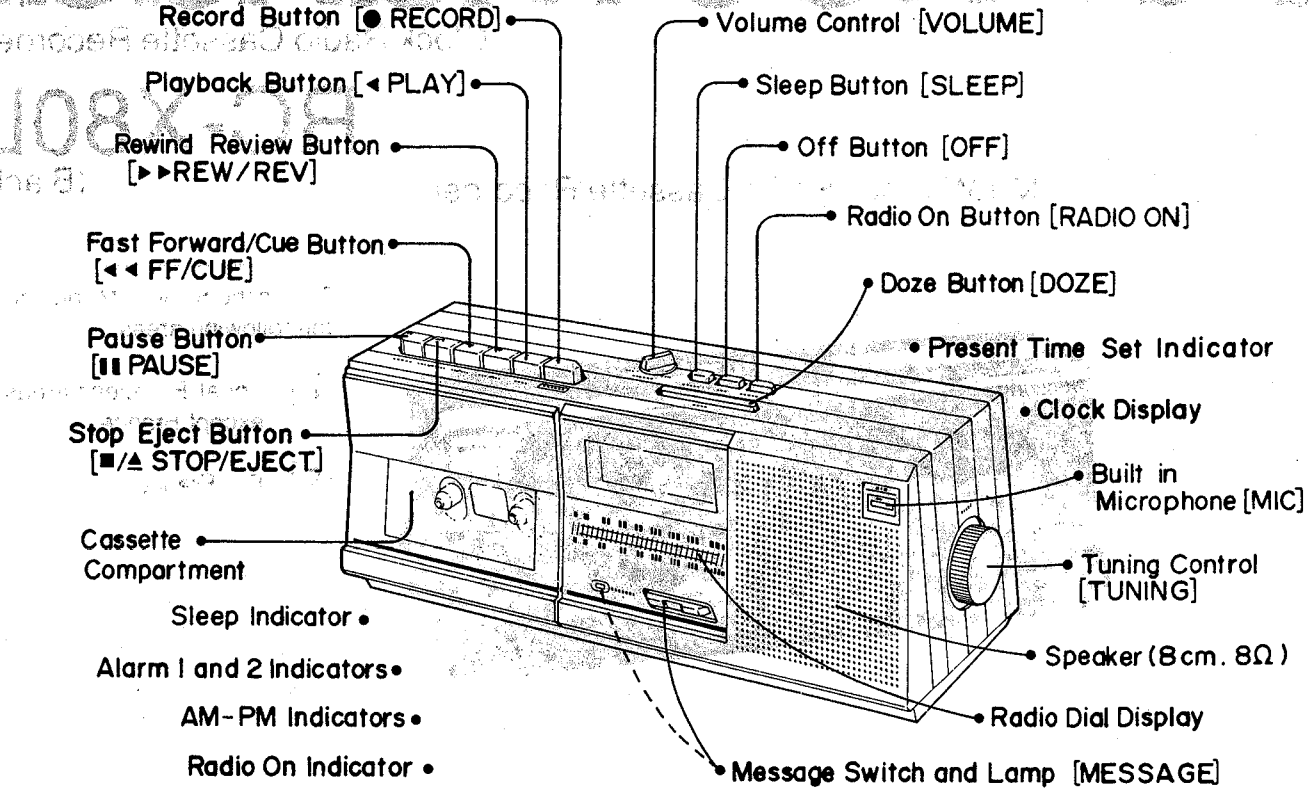
Frequency Response:	100~8,200 Hz (with normal tape)
Recording System:	DC bias, MAGNET erase
Tape Speed:	4.8 cm/s
Track System:	2-track monaural recording and playback playback

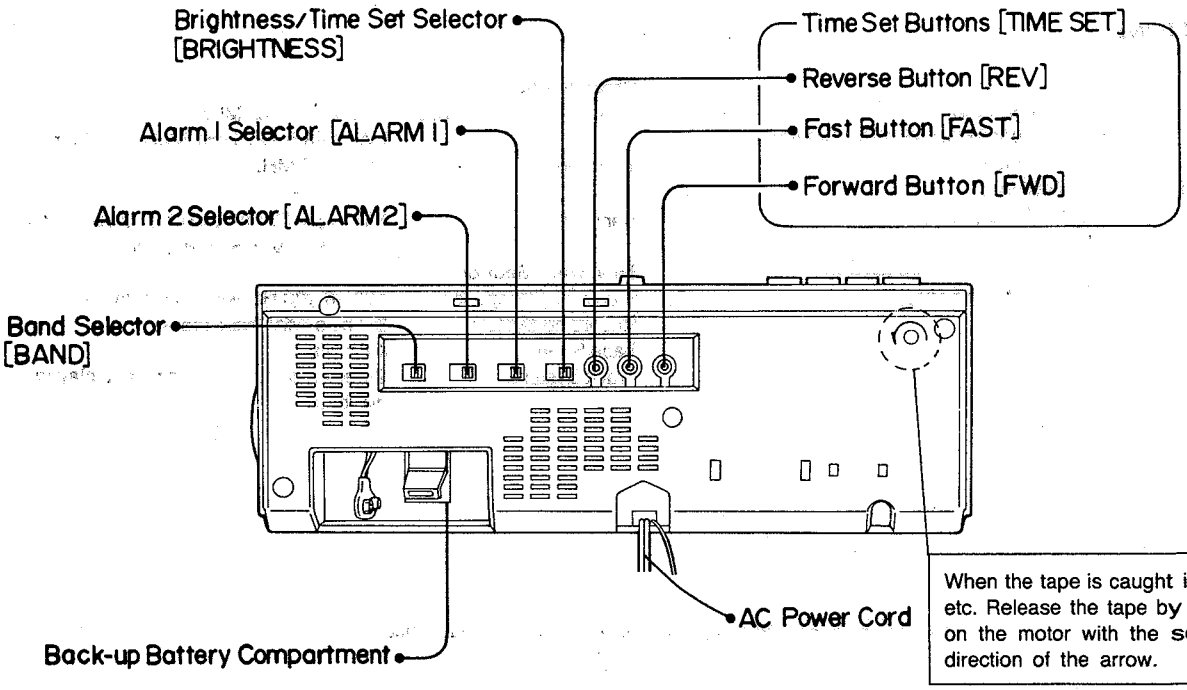
Design and specifications are subject to change without notice.

Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka, Japan

LOCATION OF CONTROLS AND COMPONENTS





When the tape is caught in the pinchi roller, etc. Release the tape by turning the pulley on the motor with the screw-driver in the direction of the arrow.

DISASSEMBLY INSTRUCTIONS

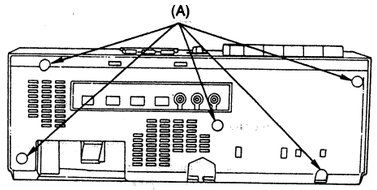


Fig. 1

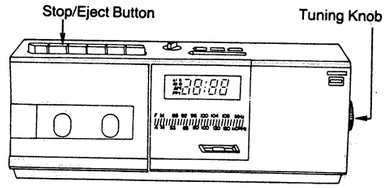


Fig. 2

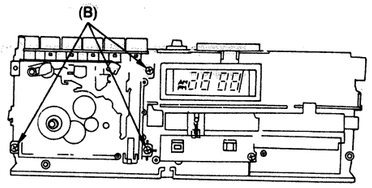


Fig. 3

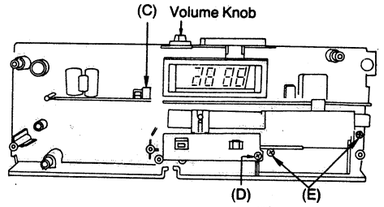


Fig. 4

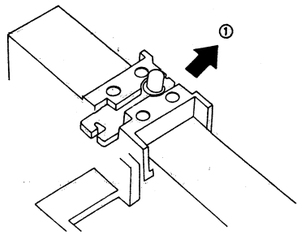


Fig. 5

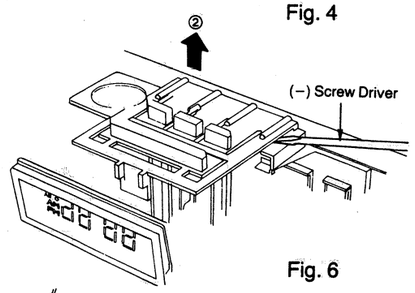


Fig. 6

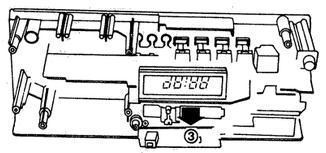


Fig. 7

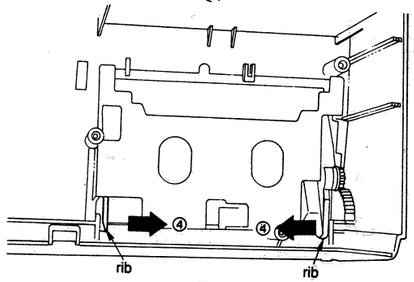


Fig. 8

Ref. No.	Shown in Fig. –.	To remove –.	Remove –.
1	1	Rear Cabinet Ass'y	Screw (3×35) mm ..... (A)×5
2	2		Pull out the tuning knob.
3			Push the Stop/Eject button.
4	3	Mechanism	Screw (3×12) mm ..... (B)×3
5	4		Socket ..... (C)×1
6	4	LED/Switch P.C.B	Screw (3×12) mm ..... (D)×1
7	4	Dial Chassis	Screw (3×12) mm ..... (E)×2
8	5	LED P.C.B	Remove the P.C.B direction of arrow ①.
9	6	Main P.C.B	Remove the sleep/doze button direction of arrow ②.
10	7		Pull out the main P.C.B direction of arrow ③.
11	8	Cassette Compartment	Push the rib direction of arrows ④.

MEASUREMENTS AND ADJUSTMENTS

■ ALIGNMENT INSTRUCTION

READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

1. Set volume control to maximum.
2. Set band selector to LW or FM.
3. Set power source voltage to AC 220 V, 50 Hz.
4. Output of signal generator should be no higher than necessary to obtain an output reading.

■ AM ALIGNMENT

	BAND	SIGNAL GENERATOR or SWEEP GENERATOR CONNECTIONS	SIGNAL GENERATOR or SWEEP GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR (ELECTRONICS VOLTMETER or SCOPE)	ADJUSTMENT	REMARKS
		LW-IF ALIGNMENT					
(1)	LW	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz 30% Mod. at 400 Hz	Point of non-interference. (on/about 600 kHz)	Output meter across voice coil.	T3 (LW IFT)	Adjust for maximum output.
		LW-RF ALIGNMENT					
(2)	LW	〃	145 kHz	Tuning capacitor fully closed.	〃	L9 (LW OSC Coil)	Adjust for maximum output.
(3)	LW	〃	262 kHz	Tuning capacitor fully open.	〃	CT4 (LW OSC Trimmer)	〃
(4)	LW	〃	150 kHz	Tune to signal.	〃	(＊1) L8 (LW ANT Coil)	Adjust for maximum output. Adjust L8 by moving coil bobbin along ferrite core.
(5)	LW	〃	250 kHz	〃	〃	CT3 (LW ANT Trimmer)	Adjust for maximum output. Repeat steps (2)~(5).

(＊1) Cement antenna bobbin with wax after completing alignment.

■ FM ALIGNMENT

	BAND	SIGNAL GENERATOR or SWEEP GENERATOR CONNECTIONS	SIGNAL GENERATOR or SWEEP GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR (ELECTRONICS VOLTMETER or SCOPE)	ADJUSTMENT	REMARKS
		FM-IF ALIGNMENT					
(1)	FM	High side thru. 0.001μF to test point ▼3. Negative side to test point ▼2.	10.7 MHz (SWP.)	Point of non-interference. (on/about 90 MHz)	Connect vert. amp. of scope to test point ▼4. Negative side to test point ▼5.	T1 (FM 1st IFT)	Adjust for maximum amplitude. (Refer to fig. 2.)
(2)	FM	〃	〃	〃	〃	T2 (FM 2nd IFT)	Adjust for maximum amplitude. (Refer to fig. 3.)
		FM-RF ALIGNMENT					
(3)	FM	Connect to test point ▼1 through FM dummy antenna. Negative side to test point ▼2.	86.2 MHz	Variable capacitor fully closed.	Output meter across voice coil.	L4 (FM OSC Coil)	(＊2) Adjust for maximum output.
(4)	FM		109.2 MHz	Variable capacitor fully open.	〃	CT2 (FM OSC Trimmer)	〃
(5)	FM		106 MHz	Tune to signal.	〃	CT1 (FM ANT Trimmer)	(＊2) Adjust for maximum output. Repeat steps (3)~(5).

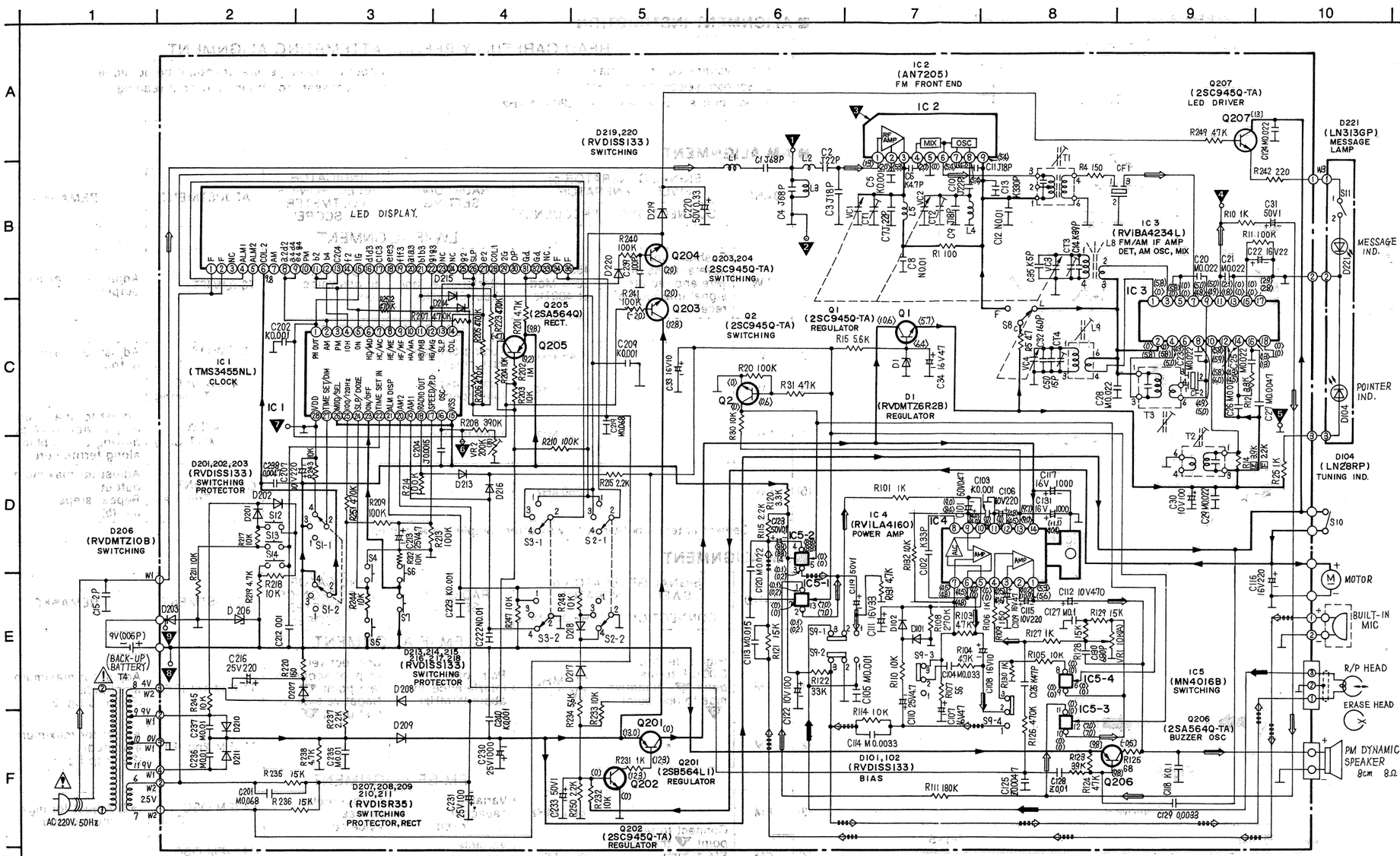
(＊2) Three output responses will be present; proper tuning is the center frequency.

■ TAPE ADJUSTMENT

ITEM	INPUT	MEASUREMENT POINT	SPECIFICATION	ADJUSTMENT POINT	REMARKS
Azimuth	QZZCFM (8 kHz, –20 dB)	Output meter across voice coil.	Maximum output.	Azimuth screw	Playback mode (Refer to Fig. 4)
Tape Speed	QZZCWAT (3 kHz)	〃	3000±90 Hz	Motor Volume	Playback mode (Refer to Fig. 5)

▼ Be sure to fold at the (▼) mark so that mark is on the outside.

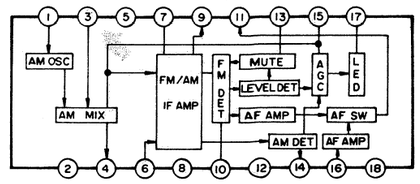
SCHEMATIC DIAGRAM



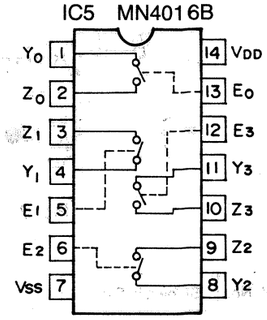
Notes:

- Z]...For all European areas except France.
- F]...For France.
- ⇨ : FM Signal Line
- ➡ : Playback Signal Line
- ⇨ : Record Signal/Line
- ⟹ : Main (Radio/Tape) Signal Line
- ⟶ : +B Line

IC3 RViBA4234L



IC5 MN4016B

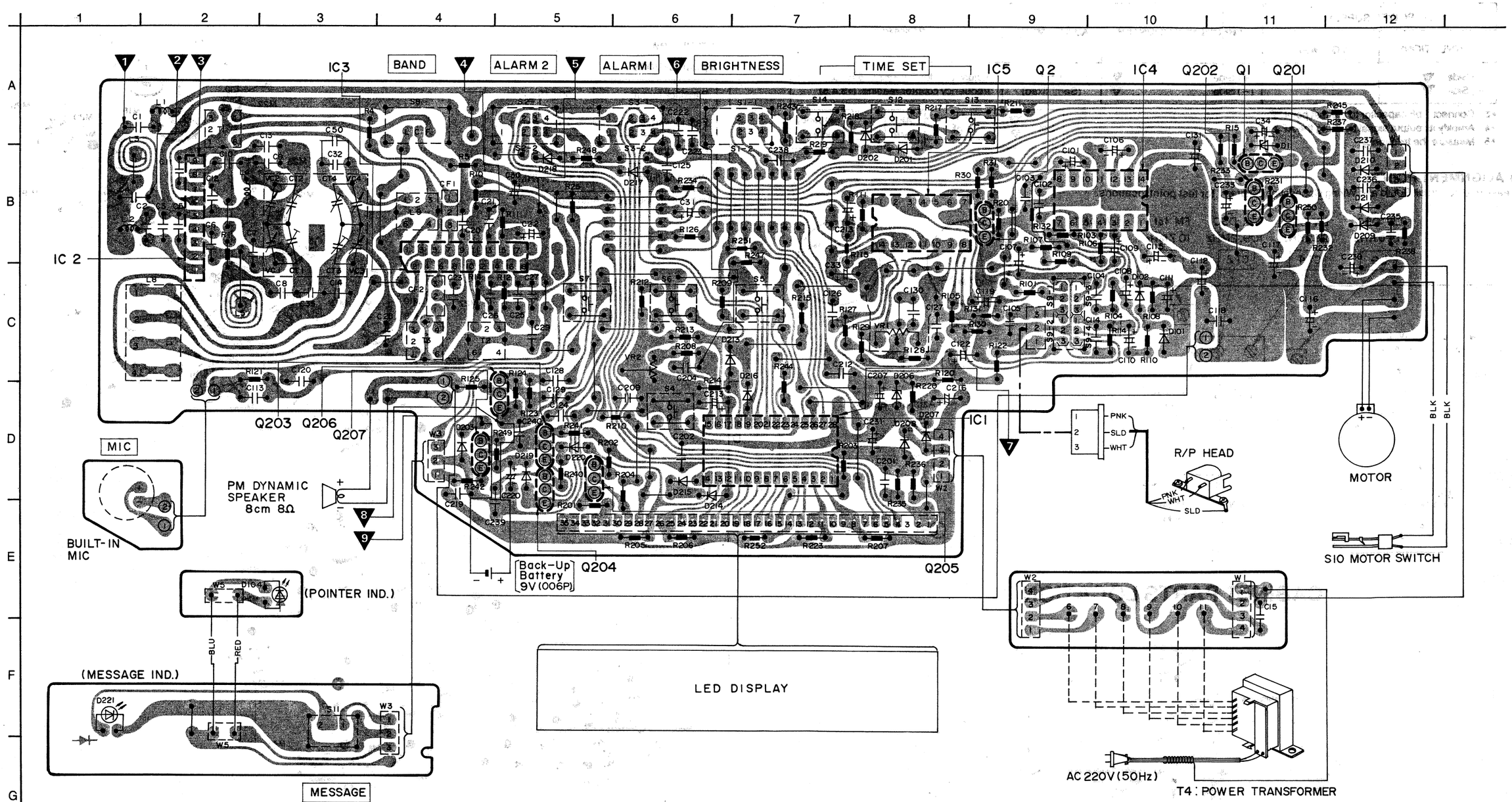


Notes:

1. S1-1, S1-2: Brightness/Time set select switch in "TIME SET" position. (1...HIGH, 3...LOW, 4...TIME SET)
2. S2-1, S2-2: Alarm 2 select switch in "OFF" position. (1...ADJUST, 3...BUZZER, 4...OFF)
3. S3-1, S3-2: Alarm 1 select switch in "OFF" position. (1...ADJUST, 3...RADIO, 4...OFF)
4. S4: Doze switch in "OFF" position.
5. S5: Sleep switch in "OFF" position.
6. S6: Radio off switch in "OFF" position.
7. S7: Radio on switch in "OFF" position.
8. S8: Band select switch in "LW" position. (F...FM, L...LW)
9. S9-1~S9-4: Record/Playback switch in "PLAYBACK" position. (1...RECORD, 3...PLAYBACK)
10. S10: Motor switch in "OFF" position.
11. S11: Message switch in "OFF" position.
12. S12: Fast switch in "OFF" position.
13. S13: Forward switch in "OFF" position.
14. S14: Reverse switch in "OFF" position.
15. VR1: Volume control VR.
16. VR2: Backup alignment VR.
17. The mark (▼) shows test point e.g. ▼ =test point 1.
18. DC voltage measurement are taken with electronics voltmeter from negative terminal of battery.
    - < >...FM
    - ( )...LW
    - [ ]...CLOCK PLAY ONLY
19. Described in schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type number is used for supply parts number and production parts number which they are identical.
    e.g. Q1
    2SC2412NRTB, LNSTB ← Production parts number
    (2SC2412) ← Supply parts number
20. The supply parts number is described alone in the replacement parts list.
21. Important safety notice
    Components identified by ⚠ mark have special characteristics important for safety.
    When replacing any of these components, use only manufacturer's specified parts.

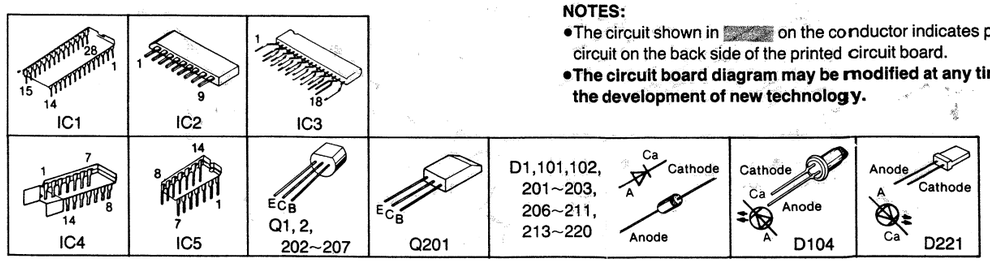
•This schematic diagram may be modified at any time with the development of new technology.

CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



NOTES:

BLK.....Black	ORG ....Orange
BLU.....Blue	PNK ....Pink
BRN ....Brown	RED ....Red
GRY ....Gray	SLD.....Shield Wire
GRN ....Green	VLT.....Violet
L.BLU....Light Blue	WHT ....White
NIL .....No Color Mark	YEL.....Yellow



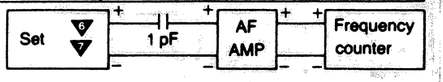
NOTES:

- The circuit shown in ▨ on the conductor indicates printed circuit on the back side of the printed circuit board.
- **The circuit board diagram may be modified at any time with the development of new technology.**

■ BATTERY BACK-UP CIRCUIT ALIGNMENT (Note: Disconnect AC power cord)

DC POWER SUPPLY		FREQUENCY COUNTER	ADJUSTMENT	REMARKS
CONNECTIONS	VOLTAGE			
(+) Side... ▼6 (−) Side... ▼7	9 volts	(+) Side ..... ▼6 (−) Side ..... ▼7	VR2 (Semi-fixed)	Adjust VR1 for 2.4 kHz±15 Hz on frequency counter reading. (*3,4,5)

*3. Connect 1 pF capacitor to the test point ▼6.
*4. Amplify its output signal by using the AF Amp.
*5. Measure the frequency.



■ ALIGNMENT POINTS

Please refer to Circuit Board and Wiring Connection Diagram for test point locations.

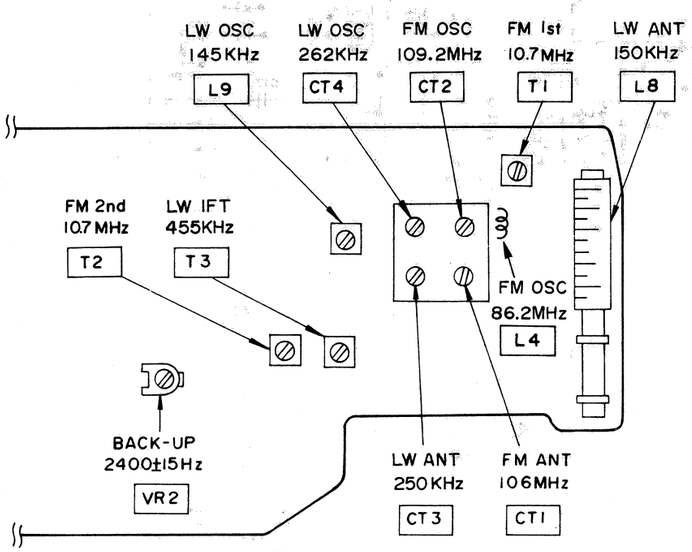


Fig. 1

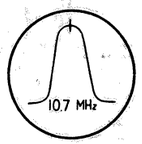


Fig. 2

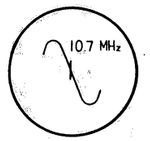


Fig. 3

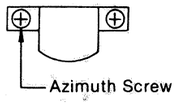


Fig. 4

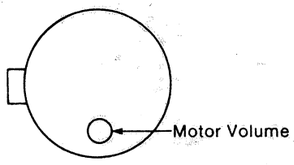
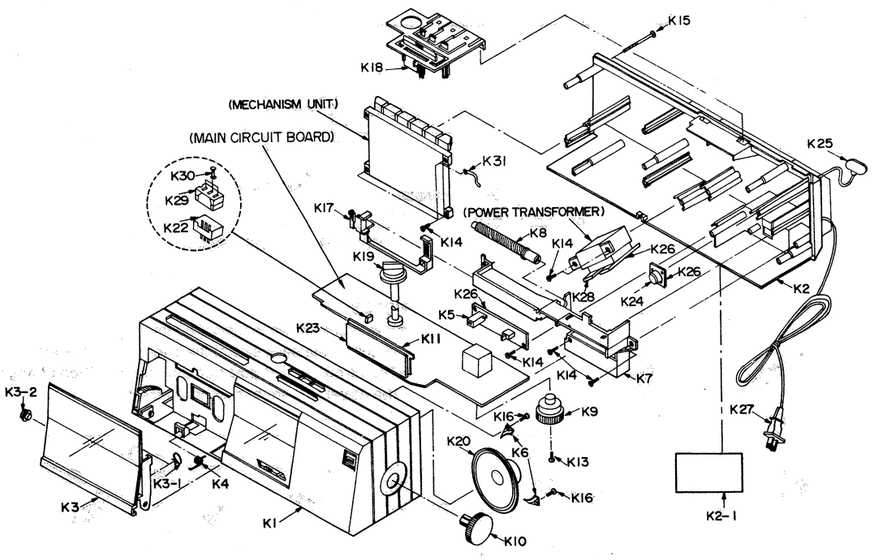


Fig. 5

CABINET PARTS LOCATION



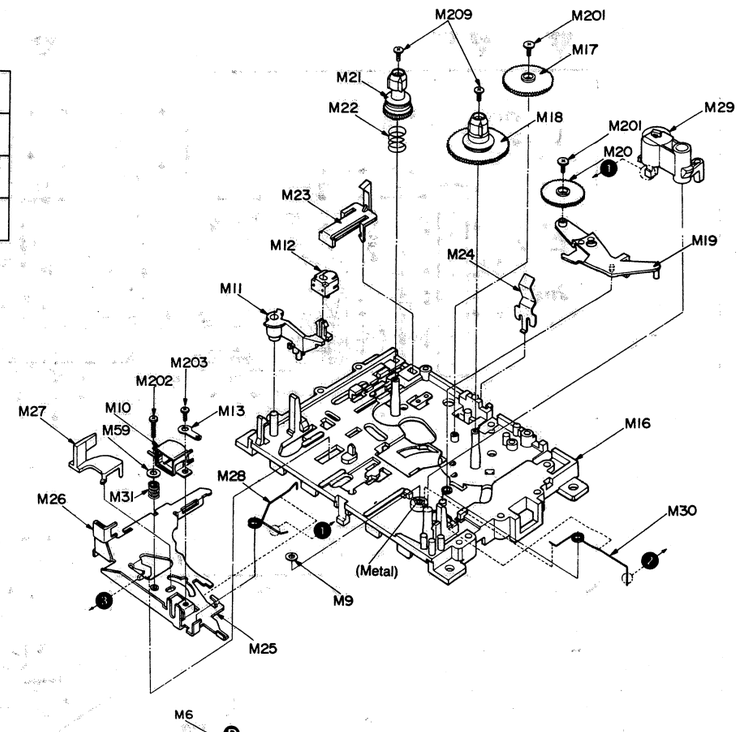
MECHANISM PARTS LOCATION

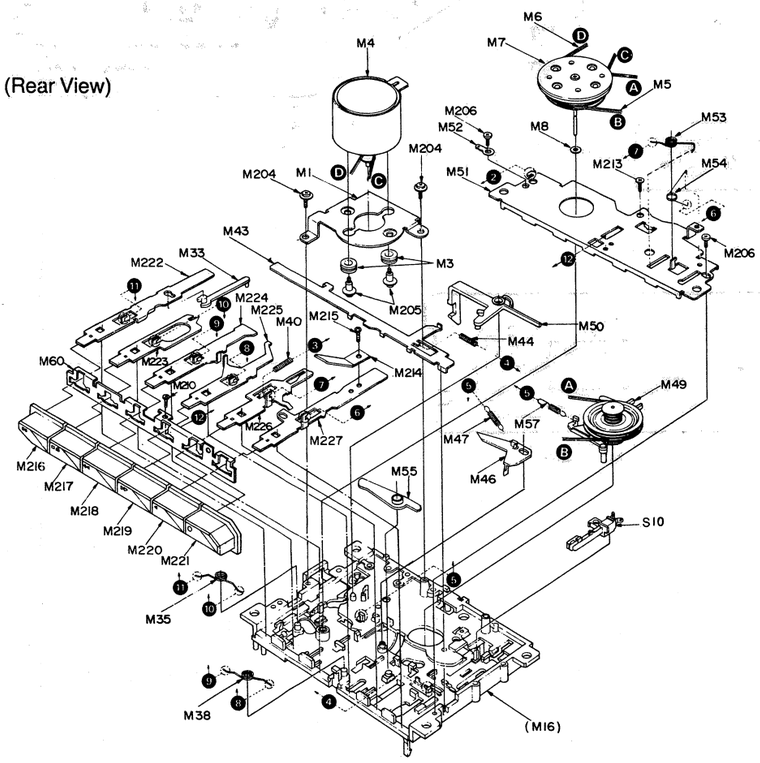
(Front View)

Specifications

Playback torque	50±15 g•cm
Fast forward torque	70^{+30}_{-20} g•cm
Rewind torque	70^{+30}_{-20} g•cm
Wow and flutter	0.35% (WRMS)

Mechanism Operation: Auto Stop





REPLACEMENT PARTS LIST

Notes;
1. Ⓜ mark stands for that the parts are supplied from MESA.
2. Important safety notice
   Components identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Part Code	Description
INTEGLATED CIRCUITS			
IC1	TMS3455NL		IC Ⓜ
IC2	AN7205		IC
IC3	RVIBA4234L		IC
IC4	RVILA4160		IC
IC5	MN4016B		
TRANSISTORS			
Q1, Q2	2SC945Q-TA		TRANSISTOR
Q201	2SB564L1		TRANSISTOR
Q202, Q203	2SC945Q-TA		TRANSISTOR
Q204	2SC945Q-TA		TRANSISTOR
Q205, Q206	2SA564Q-TA		TRANSISTOR
Q207	2SC945Q-TA		TRANSISTOR
DIODES			
D1	RVDMTZ6R2B		DIODE
D101, D102	RVD1SS133		DIODE
D104	LN28RP		DIODE
D201, D202	RVD1SS133		DIODE
D203	RVD1SS133		DIODE
D206	RVDMTZ10B		DIODE
D207, D208	RVD1SR35		DIODE
D209, D210	RVD1SR35		DIODE
D211	RVD1SR35		DIODE
D213, D214	RVD1SS133		DIODE
D215, D216	RVD1SS133		DIODE
D217, D218	RVD1SS133		DIODE
D219, D220	RVD1SS133		DIODE
D221	LN313GP		DIODE
COILS			
L1, L2	RLQY18S3W		COIL Ⓜ
L4	RLQY09S1		COIL Ⓜ
L8	RLF1C1-M		COIL Ⓜ
L9	RL02B105		COIL
TRANSFORMERS			
T1, T2	RLI4B153		I.F.TRANSFORMER
T3	RLI2B458		I.F.T.
T4	RLT5J7G8A-V	⚠	POWER TRANSFORMER Ⓜ
VARIABLE CAPACITORS			
VC1	RCV4LC2V1K		VARIABLE CAPACITOR
VARIABLE RESISTORS			
VR1	EVJF8AF20A14		VARIABLE RESISTOR
VR2	EVND4AA00B25		VARIABLE RESISTOR
FILTERS			
CF1	RVFSFE107MAZ		CERAMIC FILTER
CF2	RVFSFU455B		CERAMIC FILTER
SWITCHES			
S1, S2	RSS3B31Z		SWITCH
S3	RSS3B31Z		SWITCH
S4, S5	RSH1A45Z		SWITCH
S6, S7	RSH1A45Z		SWITCH
S8	RSS2A56ZA-H		SWITCH Ⓜ
S9	RSH2D18ZA-H		SWITCH Ⓜ
S10	RFA71ZA		SWITCH
S11	RSS2A57ZA-H		SWITCH Ⓜ
S12, S13	RSH1A45Z		SWITCH
S14	RSH1A45Z		SWITCH

Ref. No.	Part No.	Part Code	Description
CABINET PARTS			
K1	RYMCX80LZK92		FRONT CABINET ASS'Y Ⓜ
K2	RYFCX80LZKSN		REAR CABINET ASS'Y Ⓜ
K2-1	RGT1251TA-0		NAME PLATE Ⓜ
K3	RYQCX80LZKS3		CASSETTE PANEL ASS'Y Ⓜ
K3-1	RUS677ZB		Spring, Cassette Pressure Ⓜ
K3-2	RDG5874ZB		Dumper Gear Ⓜ
K4	RUW94ZB		SPRING
K5	RME415ZA-0		HOLDER
K6	RMS12C		ANGLE Ⓜ
K7	RUA722ZB-0		CHASSIS
K8	RDG5691Z		WORM SHAFT
K9	RDG5710Z		GEAR
K10	RYTCX80MKSN		KNOB ASS'Y Ⓜ
K11	RMC9011ZA		SHIELD PLATE Ⓜ
K13	XYN26+C8		SCREW WITH WASHER
K14	XTV3+12G-M		TAPPING SCREW
K15	XTN3+35G-M		TAPPING SCREW
K16	XTV3+8G-M		TAPPING SCREW
K17	RDP327ZA-0		POINTER
K18	RBC995ZB-0		BUTTON Ⓜ
K19	RBN753ZA-0		KNOB Ⓜ
K20	RAS8P29ZA		SPEAKER
K22	RJP3G4Y		PLUG(3P)
K23	RAD5LT131ZS		DISPLAY Ⓜ
K24	WM-034B7Z202		BUILT-IN-MICROLHONE
K25	RJB5009XA-1		BATTERY TERMINAL
K26	RUP2148XA		PC.BOARD W/COMPONENT Ⓜ
K27	RJA23YB-K	⚠	POWER CORD
K28	RUP2149YA-1		POWER P.C.B Ⓜ
K29	RJS3L3Z		SOCKET (3P)
K30	RJT707Z		TERMINAL
K31	RME237ZA		ANGLE
ACCESORIES			
A1	RQX4926ZA		INSTRUCTION BOOK Ⓜ
PACKINGS			
P1	RPK2457ZA		GIFT BOX Ⓜ
P2	RPN9539ZB		CUSHION
P3	XZB45X30A04		POLYETHYLENE COVER
P4	RPHX80ZA		SHEET

Ref. No.	Part No.	Part Code	Description
MECHANICAL PARTS			
M1	RFD270Z		MOTOR PLATE
M3	RFI43Z		RUBBER CUSHION
M4	RFM105ZA		DC MOTOR ASSY
M5	RFB72Z		BELT
M6	RFB73Z		BELT
M7	RFF44ZA		FLYWHEEL ASSY
M8	RFN114Z		WASHER
M9	RFN168Z		WASHER
M10	RJH0C03YZ		R/P HEAD
M11	RFY691Z		ERASE HEAD ARM
M12	RJH2C15XZ		ERASE HEAD
M13	RFE293Z		LUG PLATE
M16	RFU89Z		CHASSIS
M17	RFG92Z		GEAR
M18	RFJ60Z		TAKE UP REEL TABLE
M19	RFY702Z		IDLER ARM
M20	RFG93Z		IDLER GEAR
M21	RFJ61Z		SUPPLY REEL TABLE
M22	RFS631Z		SPRING
M23	RFY692Z		INTER LOCK ARM
M24	RFS632Z		SPRING
M25	RFU90Z		HEAD BASE
M26	RFE294Z		TAPE GUIDE
M27	RFE295Z		TAPE SENSOR
M28	RFS644ZA		SPRING
M29	RFR39Z		PINCH ROLLER ARM ASSY
M30	RFS634Z		SPRING
M31	RFS635Z		SPRING
M33	RFY694Z		PAUSE ARM
M35	RFS636Z		SPRING
M38	RFS637Z		SPRING
M40	RFS638Z		SPRING
M43	RFY700Z		FUNCTION LEVER
M44	RFS639Z		SPRING, REC LEVER
M46	RFY701Z		ARM
M47	RFS619Z		SPRING, FLYWHEEL(R)
M49	RFQ48Z		POWER ARM ASSY
M50	RFY703Z		EJECT ARM
M51	RFU91Z		PLATE
M52	RFE296Z		EARTH LUG
M53	RFS640Z		SPRING
M54	RFS626Z		SPRING
M55	RFY720ZA		LEVER, CUE/REV
M57	RFS627Z		SPRING
M59	RFE310Z		SPACER(C)
M60	RFD271Z		LEVER HOLDER
M201	RFE304Z		BUSH(SCREW)
M202	XSN2+8		SCREW
M203	XSN2+3		SCREW
M204	XTW26+8		TAPPING SCREW
M205	RFE305Z		SCREW,MOTOR
M206	RFE306Z		SCREW
M209	RFE307Z		SCREW
M210	RFE309Z		SCREW
M213	RFE308Z		SCREW

D

Ref. No.	Part No.	Part Code	Description
M214	RUS678ZA		SPRING, R/P Plate
M215	XTN2+5F		SCREW
M216	RBC1004ZA-0		BUTTON, PAUSE [M]
M217	RBC1005ZA-0		BUTTON, STOP/EJECT [M]
M218	RBC1006ZA-0		BUTTON, FF [M]
M219	RBC1007ZA-0		BUTTON, REW [M]
M220	RBC1008ZA-0		BUTTON, PLAY [M]
M221	RBC1009ZA-0		BUTTON, RECORD [M]
M222	RFY693Z		Lever, PAUSE
M223	RFY695Z		Lever, STOP/EJECT
M224	RFY696Z		Lever, FF
M225	RFY697Z		Lever, REW
M226	RFY698Z		Lever, PLAY
M227	RFY699Z		Lever, RECORD

■ RESISTORS & CAPACITORS

Notes;

(Z)...For all European areas except France.
(F)...For France.

Ref. No.	Part No.	Part Code
CAPACITORS		
C1	RCBS1H680JL	
C2	RCBS1H220JL	
C3	RCBS1H180JC	
C4	RCBS1H680JL	
C5	RCBS1H102KB	
C6	RCBS1H4R7KC	
C7	RCBS1H220JL	
C8	RCBS1C103NY	
C9	RCBS1H180JC	
C10	RCBS1H220JL	
C11	RCBS1H180JC	
C12	RCBS1C103NY	
C13	ECCT1H331K	
C14	ECCT1H390KC	
C15	ECCT1H020C	
C20, C21	ECFT1E223MD	
C22	ECEA1CU220B	
C23	ECFT1E223MD	
C25	ECFT1E473MD	
C26	ECKT1H103MD	
C27	ECKT1H472MD	
C28, C29	ECFT1E223MD	
C30	ECEA1AU101B	
C31	ECEA1HU010	
C32	ECQPZA161JZT	
C33	ECEA1CU100	
C34	ECEA1CU470	
C35	ECCT1H050CC	
C50	ECCV1H150KC	
C101	ECEA1HUR47B	
C102	ECCT1H330K	
C103	RCBS1H102KB	
C104	ECFT1E333MD	
C105	ECKT1H102KBD	
C106	ECEA1AU221B	
C107	ECEA1CU470	
C108	ECEA1CU100	
C109	ECEA1CU470	
C110	ECEA1EU4R7	
C111	ECEA1CU330B	
C112	ECEA1AU471	
C113	ECFT1E153MD	
C114	RCBS1C332MX	
C115	ECEA1AU221B	
C116	ECEA1CU221	
C117	ECEA1CU102	
C118	ECQM1H104KV3	
C119	ECEA1HU010	
C120	ECFT1E223MD	
C122	ECEA1AU101B	
C123	ECEA1HU0R1B	
C124	ECFT1E223MD	
C125	ECKT1H472MD	
C126	ECCT1H470K	
C127	ECFT1E104MD	
C128	ECKT1H103ZFD	
C129	ECKT1H332MD	
C130	RCBS1H681KB	
C131	ECEA1CU102	
C201	ECFT1E683MD	
C202	ECKT1H102KBD	
C204	ECQP2A152JZ	
C207	ECEA1AU221B	
C209	ECKT1H102KBD	
C212	ECKT1H103ZFD	
C213	ECEA1EU4R7	
C216	ECEA1EU221	
C219	ECFT1E683MD	
C220	ECEA1HUR33B	
C222	RCBS1C103NY	
C223	ECKT1H102KBD	
C230	ECEA1EU102E	
C231	ECEA1EU101B	
C233	ECEA1HU010	
C235, C236	ECKT1H103MD	
C237	ECKT1H103MD	
C238	ECKT1H472MD	
C239	ECCD1H101K	
C240	ECKT1H102KBD	
RESISTORS		
R1	ERDS2TJ101T	
R4	ERDS2TJ151	
R5	ERDS2TJ470T	
R10	ERDS2TJ102	
R11	ERDS2TJ104T	
R12	ERDS2TJ332	
R14 (F)	ERDS2TJ222	
R14 (Z)	ERDS2TJ392	
R15	ERDS2TJ562	
R20	ERDS2TJ104T	
R25	ERDS2TJ102	
R30	ERDS2TJ103T	
R31	ERDS2TJ473	
R101	ERDS2TJ102	
R103	ERDS2TJ473	
R104	ERDS2TJ472	
R106	ERDS2TJ102	
R107	ERDS2TJ560T	
R108	ERDS2TJ274	
R109	ERDS2TJ151	
R111	ERDS2TJ184	
R114	ERDS2TJ103T	
R115	ERDS2TJ222	
R120	ERDS2TJ332	
R121	ERDS2TJ153T	
R122	ERDS2TJ333	
R123	ERDS2TJ392	
R124	ERDS2TJ473	
R125	ERDS2TJ680T	
R126	ERDS2TJ474	
R127	ERDS2TJ102	
R128, R129	ERDS2TJ153T	
R130	ERDS2TJ102	
R131	ERDS2TJ472	
R132	ERD25TJ103	
R201	ERDS2TJ472	
R202	ERDS2TJ105	
R203, R204	ERDS2TJ103T	
R205, R206	ERDS2TJ474	
R207	ERDS2TJ474	
R208	ERDS2TJ394T	
R209, R210	ERDS2TJ104T	
R211, R212	ERDS2TJ103T	
R213, R214	ERDS2TJ104T	
R215	ERDS2TJ222	
R217, R218	ERDS2TJ103T	
R219	ERDS2TJ472	
R220	ERG1ANJ151	
R223	ERDS2TJ474	
R231	ERDS2TJ102	
R233	ERDS2TJ103T	
R234	ERDS2TJ562	
R235, R236	ERDS2TJ153T	
R237	ERDS2TJ222	
R238	ERDS2TJ472	
R240, R241	ERDS2TJ104T	
R242	ERDS2TJ221	
R243, R244	ERDS2TJ103T	
R245	ERDS2TJ103T	
R249	ERDS2TJ473	
R250	ERDS2TJ222	
R251, R252	ERDS2TJ474	

MESA
H.M
ZF
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